

Bichromate of Potassium as a Remedy in Gastric Affections.

BY

THOMAS R. FRASER, M.D., LL.D., F.R.S., F.R.C.P.E.

*Professor of Materia Medica and of Clinical Medicine in the
University of Edinburgh.*

(Communicated to the Eleventh International Medical Congress, held in Rome,
April, 1894; and reprinted from "The Lancet," April 14, 1894.

NOTWITHSTANDING the assertion made in 1883, and supported by much illustrative evidence, by so high an authority as Vulpian,¹ of the value of bichromate of potassium in the treatment of several forms of gastric affection, this substance has not yet gained a position among the many substances that are used in the treatment of those affections, and but meagre reference is made to it in only a few works on medicine and materia medica. Previously to Vulpian's recommendation, it had been used by internal administration as an emetic, and, with varying success, in syphilitic, broncho-pulmonary and nervous disorders; and

¹ *Journal de Pharmacie et de Chimie*, 5me. Serie tome viii., 1883, pp. 215, 321.

Drysdale¹ had advocated its employment in affections of many of the organs and structures of the body.

Having, in 1884, treated, with gratifying success, a case of persistent gastric disorder by the administration of small doses of bichromate of potassium, I have since that time administered it in a large number of cases. The results have been so favourable, that I feel myself justified in now stating my opinion of the therapeutic value of this substance, and of briefly recording a number of the cases of gastric disorder in which it was used by me.

With a few exceptions, the cases have been those of hospital patients. While such patients give the best opportunity for determining the effects of medicinal substances, it is not to be overlooked that, in some respects, they are also placed in more favourable conditions for successful treatment than the majority of private patients.

In order to simplify the therapeutic problem, the medicinal treatment was, as far as possible, limited to the administration of bichromate of potassium. This limitation, however, could not be adhered to in all cases; but only those cases will be described in which bichromate of potassium alone was administered, or with the addition of other remedies, such as purgatives, rendered necessary by the circumstances of the patient, and unlikely to obscure the effects of the chief remedy.

For the sake of brevity I have recorded the cases in tabular form, and in two groups—the first group comprehending eighteen cases of various forms of dyspepsia unassociated with evidence of gastric ulcer, and the second, ten cases in which distinctive symptoms of ulcer had been present at some previous time.

¹ "Materia Medica," 1851, pp. 39 to 52; and *The Medical Press and Circular*, April 28, 1886, p. 379.

DYSPEPSIA.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
1. Henry Laisson, miner	26	Anorexia; pain in stomach fifteen minutes after food, with distension, frequent nausea and occasional vomiting after food; diarrhoea and headache. Tenderness (great) at upper part of epigastrium. These symptoms had been present for five months	Milk diet. Oct. 28, $\frac{1}{10}$ th gr. bichromate of potassium twice daily till Nov. 13, and thrice daily till Nov. 20	On Nov. 8 decidedly improved; on 18th on convalescent diet, and no symptom present except slight and brief pain after food, but not if patient remained resting. Discharged cured on Nov. 22.
2. Maggie Moyes, domestic servant	22	Had been dyspeptic for many years, but this attack commenced a month ago. Anorexia, headache, frequent vomiting, pain and tenderness in gastric region, and constipation	Oct. 18, milk diet, cascara extract night and morning, bichromate of potassium $\frac{1}{10}$ th gr., thrice daily	On Oct. 21 much better and no pain after food; on Oct. 24 no tenderness or other symptom. On Oct. 25 on convalescent diet; and on Nov. 1 dismissed, having gained several pounds in weight.
3. Elizabeth Cameron, printing machine worker	20	Had gastric ulcer when 19 years of age. Present illness began seven days before admission; epigastric pain on taking food, with vomiting half an hour afterwards, producing relief of pain, great weakness, tenderness on palpation, constipation	Oct. 4, cascara extract, milk diet Oct. 21, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	Before Oct. 21 pain and tenderness were continuous, with occasional vomiting. After bichromate commenced, pain, tenderness and sickness quickly disappeared and patient was dismissed cured on Oct. 29.
4. John A. Mitchell, grocer's assistant	15	Severe headache with nausea and vomiting for twelve months	Dec. 10 to 18, bismuth, rhubarb and soda. Dec. 28, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	Improved considerably from Dec. 10 to 18, but often bad headache, nausea and vomiting. Bichromate was then substituted, after which headache and vomiting altogether disappeared, and nausea after food rapidly lessened till he was dismissed cured on Dec. 31.
5. Robert Wilson, coal miner	41	Eight years ago, gastralgia lasting for a year; one year ago, gastralgia for one month; one month ago, present illness, consisting of sensations of weight and pain in stomach about an hour after food, eructations, vomiting every two or three days, epigastric tenderness and constipation	Jan. 7 to 12, Exalgine. Jan. 12, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	No improvement till Jan 12. Subsequently, considerable alleviation and, ultimately, disappearance of vomiting. Patient was dismissed much improved on Jan. 19

DYSPEPSIA—continued.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
6. Jane Grubb, domestic servant	23	Been dyspeptic for years. On admission suffered from flatulence, epigastric pain and tenderness, and occasional vomiting, which had all been present in severe form for four months	Feb. 24, to March 7, extract of cascara; March 7 to 16, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	Improved to March 7, but still tenderness, flatulence and pain after food. On March 9 there was no longer tenderness or pain after food. Dismissed cured on March 17.
7. William Rowan, brass finisher	19	For several months, pain immediately after food, lasting for about an hour, flatulent distension, epigastric tenderness, some enlargement of stomach. Patient also has presystolic mitral disease	March 10, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	On March 18, no pain after food, flatulence or epigastric tenderness. There were no further gastric symptoms although patient was kept in hospital till April 5, because of the cardiac disease.
8. Annie Fernie, lithographer	20	For four months, anorexia, discomfort, nausea, pain and vomiting after food. Slight anæmia. Constipation	From Feb. 11 to March 3, cascara, cod liver oil and ferrous chloride. March 3, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	The anæmia soon disappeared. The gastric symptoms persisting, bichromate was administered. The dyspepsia improved until, in five days, fish and chicken were taken without any discomfort; and she was dismissed cured a few days afterwards.
9. Alex. Burgess, printer.	50	For a year, epigastric pain and tenderness, nausea and vomiting after food, flatulence, constipation. Also suffers from aortic stenosis, and has an alcoholic history	Oct. 28 to Nov. 4, calomel and compound jalap powder at first, and then comp. tinct. of cardamoms. Nov. 4 to 16, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily.	No distinct improvement evident till Nov. 6, when for first time no pain or nausea. On 14th no symptom of gastric disorder. Dismissed cured on Nov. 16.
10. Jessie F. Lancaster, worker in india-rubber manufactory.	25	For two years, dyspeptic symptoms, sometimes severe. On admission, anorexia, thirst, gastric pain and tenderness, occasional vomiting, acid cructations after food, flatulent distension and constipation.	On Dec. 11, $\frac{1}{12}$ th gr. bichromate of potassium thrice daily, increased to $\frac{1}{8}$ th gr. on Dec. 16; liquid extract of cascara for several days.	In five days after beginning bichromate of potassium, eructations and gastric pain had disappeared, and in ten days epigastric tenderness could not be elicited. Patient was dismissed while taking light diet without discomfort on Jan. 3.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
11. Andrew Pryde, horse driver	52	For about six months, anorexia, vomiting immediately after food, epigastric pain and tenderness. There is moderate enlargement of the liver and an alcoholic history	Aug. 9, bichromate of potassium $\frac{1}{2}$ th gr., thrice daily	Vomiting, epigastric pain and tenderness gradually diminished, and had disappeared when patient was dismissed from hospital on Aug. 17, but anorexia was still present.
12. Margaret Maxwell, domestic servant	25	For four months, severe gastric pain, with nausea, lasting about six hours daily, apparently excited by food, frequent vomiting, anorexia and epigastric tenderness	June 9, bichromate of potassium $\frac{1}{4}$ th gr., thrice daily	Gradual improvement, until in nine days epigastric pain and tenderness and vomiting had disappeared. After the symptoms had been absent for twelve days, owing to an error in diet, they returned for seven days; they afterwards again entirely disappeared, and patient was dismissed cured on July 17.
13. Jessie Baillie, shop-girl	14	For one month, sickness and vomiting after food; and for two months, epigastric pain with anorexia. There is also epigastric tenderness	Feb. 21, bichromate of potassium $\frac{1}{2}$ th gr., thrice daily	Before bichromate treatment, the patient improved considerably on milk diet, and improvement rapidly increased after bichromate, so that in fourteen days, all the symptoms had disappeared.
14. Jessie Bowie, nursery maid	18	For six weeks, pain and frequently vomiting an hour after food, epigastric tenderness, slight constipation. There is also considerable anemia	Milk diet. Nov. 3, bichromate of potassium $\frac{1}{2}$ th gr., thrice daily	In four days, all the dyspeptic symptoms had disappeared, except that pain and nausea occurred unless patient lay down after meals. She was dismissed, cured of the gastric symptoms, on Nov. 14.
15. Mary Ann Murdoch, general servant	20	For three years, symptoms of dyspepsia. Now, anorexia, thirst, sensations of distension and pain immediately after food, followed by nausea and vomiting. There is also constipation and slight jaundice, and the stomach is somewhat enlarged. The patient is anemic	From Sept. 12 to Oct. 20, bismuth and iron. From Oct. 21 to Nov. 28, bichromate of potassium $\frac{1}{2}$ th gr., thrice daily	Under iron and bismuth, the dyspeptic symptoms, though improved, were not materially so. Two days after commencing bichromate of potassium, a decided improvement was observed. In four days, sickness, nausea and epigastric tenderness had disappeared, though on several occasions, during a few subsequent days, pain occurred after food.

DYSPEPSIA—continued.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
16. Helen Stark, mill-worker	25	For several years, occasional attacks of vomiting and faintness, followed by headache. Shortly before admission, these attacks occurred weekly, and were preceded by abdominal distension and pain following food	Nov. 9, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily. On Nov. 15, also extract of <i>cassia</i> nightly	Epigastric pain soon disappeared, and patient was dismissed on Nov. 19 free from symptoms.
17. Maggie Moncrieff, domestic servant	18	For eighteen months, pain in stomach and vomiting, with several intervals of partial relief. On admission, above symptoms, which had been present in severe form for about four months, and in addition marked epigastric tenderness and moderate constipation	Jan 4, extract of <i>cassia</i> night and morning. Jan. 8, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily, increased on Jan. 10, to $\frac{1}{8}$ th gr. Milk diet from Jan. 3 to 19, when farinaceous foods were added. On Feb. 3, convalescent diet with fish and white animal food was taken without discomfort	No material improvement until Jan. 11, when pain after food was lessened, and it disappeared on Jan. 17, but returned for brief intervals after food from Jan. 24 to 27, and did not recur afterwards. Epigastric tenderness could be elicited only by deep percussion on Jan. 28, and it altogether disappeared on Feb. 1. Patient was dismissed cured on Feb. 13.
18. Maggie Walls, domestic servant	22	For three months, anemic and dyspeptic symptoms; the latter becoming gradually more severe, until, for three weeks previous to treatment, patient vomited after every meal, except when lying down. She has, also, anorexia, epigastric pain and tenderness. She has considerable anemia	Oct 12, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily, increased on Nov. 3 to $\frac{1}{8}$ th gr., thrice daily, and continued to Nov. 16, when ferrous chloride was substituted, on account of the anemia	The gastric symptoms rapidly improved until, in nine days, they had entirely disappeared, while the anemia had not materially improved. The blood, however, became normal soon after iron was administered.

GASTRIC ULCER.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
19. Lillas Ann Clark, domestic servant	27	Three years and three months ago, pain half an hour after food, lasting about an hour and a half, and flatulence. Soon, vomiting, which by and by contained blood, but has not done so for some months; headache and constipation. Symptoms and weakness more urgent latterly	April 13, bichromate of potassium $\frac{1}{10}$ th gr., thrice daily; Carlsbad salts every morning, milk diet	On April 25 no longer any nausea or vomiting, and pain after food less severe and of shorter duration. On May 8 all gastric symptoms had disappeared and light diet was taken. She remained in hospital for another fortnight, and when dismissed was taking almost ordinary diet, and had gained one stone in weight.
20. Eliza Boyne, nursery maid	27	Dyspepsia for several years. Two years ago, persistent pain in stomach, much increased by food; nausea, frequent vomiting, containing blood, a year ago; constipation and great feebleness. On admission, above symptoms with epigastric tenderness, flatulent distension, and acid eructations	March 14, bichromate of potassium $\frac{1}{10}$ th gr., twice daily, Carlsbad salts each morning until March 20. Subsequently, also, aloes and iron pills	Vomiting, which before treatment occurred in hospital daily, and frequently several times a day, became less frequent and ceased on March 26. The patient was dismissed cured on April 9.
21. Helen White, domestic servant	25	Eight and also three years ago had been severely ill with gastric symptoms. Six weeks before admission pain and sickness occurred, and a fortnight before admission the patient began to vomit after every meal, the vomited matter frequently containing blood. In addition, suffers from anorexia, constipation and epigastric tenderness.	June 20, extract of cascara nightly, and bichromate of potassium $\frac{1}{12}$ th gr., thrice daily	Vomiting last occurred on June 24, but nausea, especially after meals, continued until the 26th. Pain and tenderness had disappeared on June 30. Patient was dismissed, free from gastric symptoms, on July 4.
22. Anne Gentle, mill-worker	32	About fifteen months before admission, abdominal pain with distension and eructations, followed by frequent vomiting, containing blood three months before admission, great pain in epigastrium and thorax, epigastric tenderness and constipation. In addition to above, considerable enlargement of the stomach was found to be present	From Jan 26 to Feb. 5, asafoetida, cardamoms and cascara. On Feb. 6, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily. Subsequently, ferrous chloride	Rapid improvement, so that on Feb. 12, no gastric symptoms were present except occasional slight epigastric pain. This last symptom disappeared in a few days, and patient was dismissed cured on March 3.

GASTRIC ULCER—continued.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
23. Minnie Dinnie, cook	20	For several years, flatulence and eructations after food. Six months before admission began to vomit occasionally, and one month before admission, frequently with blood in vomited matter, also constant epigastric pain increased by food, nausea, anorexia, constipation, and epigastric tenderness. Patient also suffered from <i>molluscum fibrosum</i>	Jan. 10 to 17, bismuth, rhubarb and soda. Jan 17, bichromate of potassium $\frac{1}{15}$ th gr., thrice daily. Milk diet until Jan. 24	On Jan. 20, distinct improvement, but epigastric tenderness was still present. On Jan. 24, all gastric symptoms were absent, and milk diet was departed from.
24. Lilius Verone, professional dancer	20	Had vomiting of blood a year before admission. Three weeks before admission fainted several times, and vomited a little blood, since then has vomited several times daily, without blood, about two hours after food; suffers from epigastric pain after food, constipation, and considerable epigastric tenderness	From Jan 13 to 17, bismuth, rhubarb and soda; but pain and vomiting were not removed. Jan. 17 to Feb. 21, bichromate of potassium $\frac{1}{15}$ th gr., thrice daily. Again from March 3 to 24, bichromate in above doses	On Jan. 18, no pain, vomiting or nausea. On Feb. 27 (bichromate had been stopped on Feb. 21), a recurrence of pain, nausea and vomiting. March 5 to 24, no symptoms of gastric disorder (bichromate was again being taken). Patient was dismissed, free from gastric symptoms, on March 24.
25. John McGibbon, labourer in a brewery	37	Gastric pain and vomiting at intervals for eight years. Present attack about ten days before admission; great gastric pain and vomiting after food, containing blood; flatulence, acid eructation, constipation, epigastric tenderness. After admission, all above present except vomiting	From March 5 to 11, bismuth, rhubarb and soda. From March 11 to 30, bichromate of potassium $\frac{1}{15}$ th gr., thrice daily	Some slight temporary relief of pain between March 7 and 11. On March 13, pain greatly lessened; and all pain, tenderness and nausea had disappeared on March 18. Patient was put on convalescent diet on March 19. On the 21st and 22nd there was slight pain for a short time, which did not recur; and patient was dismissed on March 30 entirely free from pain, nausea or epigastric tenderness.

Name.	Age.	Symptoms and Duration.	Treatment.	Effects and Time of Production.
26. Mary Chisholm, cook	29	A month before admission, hæmatemesis with tarry dejections. On admission, thirst, moderate constipation, epigastric pain increased by food, epigastric tenderness, anaemia. No vomiting after admission	Oct. 14, extract of cascara each night. Oct. 20, bichromate of potassium $\frac{1}{12}$ th gr., thrice daily till Nov. 12. Milk diet till Oct. 21; afterwards gradually increased to convalescent diet, and on Nov. 8 to full diet	On Oct. 24 all stomach pain had disappeared. On Nov. 1 no epigastric tenderness was present.
27. Wilhelmina Ross, cook	47	About five years ago, vomiting after food, from which she recovered. Four months before admission, vomiting recurred, with severe gastric pain following food, and blood was present on more than one occasion. Patient is very feeble, there is epigastric tenderness, and the stomach is moderately enlarged, and a hard small mass can be felt near the pyloric extremity	June 20, bichromate of potassium $\frac{1}{4}$ th gr., increased on 25th, to $\frac{1}{6}$ th gr., thrice daily. Milk diet from June 14 till July 24	Vomited thrice on June 20, and daily till June 24. Since this date there has been no further vomiting or pain. On July 9 epigastric tenderness had disappeared. She was able to eat white flesh without discomfort before her dismissal on August 3, when she had gained seventeen pounds in weight.
28. Margaret Geffreys, married	35	About nine months before admission, pain, nausea and vomiting, after food. Recovered in about six weeks. Symptoms returned in more severe form, two months before admission. Pain comes on chiefly an hour after food, even diluted milk, and is followed by nausea and vomiting. Since admission, blood was present on two occasions. There is also much epigastric tenderness, and constipation	May 7, bichromate of potassium $\frac{1}{4}$ th gr., thrice daily. Milk diet till May 21, gradually improved to convalescent diet	Vomiting, which previously occurred daily, ceased on May 13, until May 22, when one attack of vomiting occurred, but without pain. From this time, improvement was continued without interruption; appetite, strength and weight were recovered; and gastric symptoms were entirely absent when she left hospital on June 2.

An examination of the above records shows that bichromate of potassium is capable of relieving, and often in a short time of removing, the entire group of symptoms, if we except constipation and anæmia, encountered in dyspepsia, and, especially, anorexia, pain, nausea, vomiting and gastric tenderness.

While the doses administered in these cases have varied from $\frac{1}{12}$ to the $\frac{1}{8}$ of a grain (0.005 to 0.01 gramme), thrice daily, it will be observed that in the greatest number of the cases the smallest of these doses was administered, and was found sufficient. The dose should be given during fasting and in as empty a condition of the stomach as possible. The administration was effected in the form of pill or solution; and no difficulty was experienced by the patient in the taking of a simple solution in water, although occasionally, and especially with the larger doses, flavouring agents were added, such as syrup of tolu, or of orange.

Taking into account the supposed predominating influence of disorders of the alimentary canal in producing anæmia, it might by some have been expected that an agent, which is decidedly curative in dyspepsia, would, at the same time, exert a curative influence in anæmia. Several of my cases, however, have shown that this is not so, and have thus given evidence that the therapeutic benefit is the result of an action restricted to the stomach. The case of M. Walls (No. 18) serves to illustrate this. On October 12, when treatment with bichromate of potassium was commenced, an examination of the blood showed that the hæmocytes numbered 4,300,000 and that the hæmoglobin amounted to 40 per cent. All gastric symptoms had disappeared on October 21, when the hæmocytes numbered 4,100,000, and the hæmoglobin amounted to 38 per cent. Bichromate of potassium was continued until November 16, and even then, although the patient had

for some time been eating well and had gained weight, the hæmocytes numbered 3,700,000, and the hæmoglobin amounted to 52 per cent. On this date ferrous chloride was substituted for bichromate of potassium, and on November 25 the hæmocytes numbered 5,000,000, and the hæmoglobin amounted to 79 per cent.

In a few cases of acute gastric ulceration with hæmatemesis in which I have given bichromate of potassium, the results were not favourable, as it did not succeed in checking the bleeding. I found, however, that its astringent action is very slight, for a solution of egg albumen, which was rendered hazy by 0.01 per cent. solution of nitrate of silver, was not distinctly changed by 3 per cent. solution of bichromate of potassium, and was rendered only slightly hazy by 4 per cent. solution.

At the same time, bichromate of potassium possesses a strong anti-putrefactive power, which is exhibited in albuminous, saccharine and phosphatic urines even with a 0.01 per cent. solution.

This action probably constitutes one of the causes of its anti-dyspeptic therapeutical value, but there are undoubtedly other causes, such as a direct or indirect analgesic action, and, probably, a selective action on the nutrition or function of certain histological structures, which I am now engaged in endeavouring to determine.

